<u>Amendments to the Claims</u>:

The following listing of claims will replace all prior versions, and listings, of claims in the application:

1. (Previously Presented) A catadioptric optical system forming a reduced image of a first surface onto a second surface comprising:

a first imaging optical subsystem which is arranged in an optical path between the first surface and the second surface and has a dioptric imaging optical system to form a first intermediate image of the first surface;

a first folding mirror which is arranged in the vicinity of a position of forming the first intermediate image to deflect a beam prior to or after the position where the first intermediate image is formed;

a second imaging optical subsystem for forming a second intermediate image with a magnification factor nearly equal to the first intermediate image in the vicinity of a position of forming the first intermediate image based on the beam from the first intermediate image, the second imaging optical subsystem has a concave reflecting mirror and at least one negative lens;

a second folding mirror which is arranged in the vicinity of a position of forming the first intermediate image to deflect a beam prior to or after the position where the second intermediate image is formed; and

a third imaging optical subsystem which is arranged in an optical path between the second imaging optical subsystem and the second surface and has a dioptric imaging optical system to form the reduced image onto the second surface based on the beam from the second intermediate image.

2. (Original) The catadioptric optical system of Claim 1, wherein a reflecting surface of the first folding mirror and a reflecting surface of the second folding mirror are positioned so that they do not overlap spatially.

3. (Original) The catadioptric optical system of Claim 2, wherein all lenses constituting the first imaging optical subsystem and all lenses constituting the third imaging optical subsystem are arranged along a single optical axis.

4. (Original) The catadioptric optical system of Claim 3, wherein a magnification factor $\beta 2$ of the second imaging optical subsystem satisfies the following condition:

$$0.82 < |\beta 2| < 1.20.$$

5. (Original) The catadioptric optical system of Claim 4, wherein the following condition is satisfied:

$$|L1-L2| / |L1| < 0.15,$$

where a first distance between the first intermediate image and the concave reflecting mirror in the second imaging optical subsystem along the optical axis is defined as L1, and a second distance between the second intermediate image and the concave reflecting mirror in the second imaging optical subsystem along the optical axis is defined as L2.

6. (Original) The catadioptric optical system of Claim 5, wherein the following condition is satisfied:

$$0.20 < |\beta| / |\beta 1| < 0.50,$$

where a magnification of the catadioptric optical system is defined as β, and a magnification of the first imaging optical subsystem is defined as $\beta 1$.

7. (Original) The catadioptric optical system of Claim 6, wherein the catadioptric optical system is a telecentric optical system on both sides of the first surface and the second surface, and satisfies the following condition:

$$|E - D| / |E| < 0.24,$$

where a distance between a surface of the first imaging optical subsystem on a most image side and an exit pupil position along the optical axis is defined as E, and a distance by air conversion from the surface of the first imaging optical subsystem on the most image side to the concave reflecting mirror in the second imaging optical subsystem along the optical axis is defined as D.

8. (Previously Presented) The catadioptric optical system of Claim 7, wherein:

the first intermediate image is formed in an optical path between the first folding mirror and the second imaging optical subsystem; and

the second intermediate image is formed in an optical path between the second imaging optical subsystem and the second folding mirror.

9. (Original) The catadioptric optical system of Claim 8, wherein:

85% of the number of lenses in all lenses constituting the catadioptric optical system are arranged along the single optical axis.

10. (Original) The catadioptric optical system of Claim 9, wherein:

an intersection line of an extension plane of the reflecting surface of the first folding mirror and an extension plane of the reflecting surface of the second folding mirror is set up so that an optical axis of the first imaging optical subsystem, an optical axis of the second imaging optical subsystem and an optical axis of the third imaging optical subsystem intersect at one point.

11. (Original) The catadioptric optical system of Claim 10, wherein:

the second imaging optical subsystem has at least two negative lenses.

12. (Previously Presented) The catadioptric optical system of Claim 11, wherein:

the first folding mirror has a back surface reflecting mirror for reflecting a beam from the first imaging optical subsystem to the second imaging optical subsystem; and

the second folding mirror has a back surface reflecting mirror for reflecting a beam from the second imaging optical subsystem to the third imaging optical subsystem.

13. (Original) The catadioptric optical system of Claim 12, wherein:

the catadioptric optical system forms the reduced image on a position deviating from a position of reference in an optical axis of the catadioptric optical system on the second surface.

14. (Original) The catadioptric optical system of Claim 1, wherein:

a plurality of lenses constituting the first imaging optical subsystem and a plurality of lenses constituting the third imaging optical subsystem are arranged along a single optical axis.

15. (Original) The catadioptric optical system of Claim 1, wherein a magnification $\beta 2$ of the second imaging optical subsystem satisfies the following condition:

$$0.82 < |\beta 2| < 1.20.$$

16. (Original) The catadioptric optical system of Claim 1, wherein the following condition is satisfied:

$$|L1 - L2| / |L1| < 0.15,$$

where a first distance between the first intermediate image and the concave reflecting mirror in the second imaging optical subsystem along the optical axis is defined as L1, and a second distance between the second intermediate image and the concave reflecting mirror in the second imaging optical subsystem along the optical axis is defined as L2.

17. (Original) The catadioptric optical system of Claim 1, wherein the following condition is satisfied:

$$0.20 < |\beta| / |\beta 1| < 0.50,$$

where a magnification of the catadioptric optical system is defined as β, and a magnification of the first imaging optical subsystem is defined as $\beta 1$.

18. (Original) The catadioptric optical system of Claim 1, wherein the catadioptric optical system is a telecentric optical system on both sides of the first surface and the second surface, and satisfies the following condition:

$$|E - D| / |E| < 0.24,$$

where a distance between a surface of the first imaging optical subsystem on a most image side and an exit pupil position along the optical axis is defined as E, and a distance by air conversion from the surface of the first imaging optical subsystem on the most image side to the concave reflecting mirror in the second imaging optical subsystem along the optical axis is defined as D.

19. (Previously Presented) The catadioptric optical system of Claim 1, wherein:

the first intermediate image is formed in an optical path between the first folding mirror and the second imaging optical subsystem; and

the second intermediate image is formed in an optical path between the second imaging optical subsystem and the second folding mirror.

20. (Cancelled)

21. (Original) The catadioptric optical system of Claim 1, wherein:

85% of the number of lenses in all lenses constituting the catadioptric optical system are arranged along the single optical axis.

22. (Original) The catadioptric optical system of Claim 1, wherein an intersection line of an extension plane of a reflecting surface of the first folding mirror and an extension plane of a reflecting surface of the second folding mirror is set up so that an optical axis of the

first imaging optical subsystem, an optical axis of the second imaging optical subsystem and an optical axis of the third imaging optical subsystem intersect at one point.

23. (Original) The catadioptric optical system of Claim 1, wherein the second imaging optical subsystem has at least two negative lenses.

24. (Previously Presented) The catadioptric optical system of Claim 1, wherein:

the first folding mirror has a back surface reflecting surface for reflecting a beam from the first imaging optical subsystem to the second imaging optical subsystem; and

the second folding mirror has a back surface reflecting surface for reflecting a beam from the second imaging optical subsystem to the third imaging optical subsystem.

25. (Original) The catadioptric optical system of Claim 1, wherein:

the catadioptric optical system forms the reduced image in a position deviating from a position of a reference optical axis of the catadioptric optical system on the second surface.

26. (Previously Presented) A catadioptric optical system forming a reduced image of a first surface onto a second surface comprising:

a first imaging optical subsystem with a first optical axis, which is arranged in an optical path between the first surface and the second surface and has a dioptric imaging optical system;

a second imaging optical subsystem with a concave reflecting mirror and a second optical axis, which is arranged in an optical path between the first imaging optical subsystem and the second surface; and

a third imaging optical subsystem with a third optical axis, which is arranged in an optical path between the second imaging optical subsystem and the second surface and has a dioptric imaging optical system,

wherein the first optical axis and the second optical axis intersect with each other and the second optical axis and the third optical axis intersect with each other.

27. (Previously Presented) A catadioptric optical system forming a reduced image of a first surface onto a second surface comprising:

a first imaging optical subsystem with a first optical axis, which is arranged in an optical path between the first surface and the second surface and has a dioptric imaging optical system;

a second imaging optical subsystem with a concave reflecting mirror and a second optical axis, which is arranged in an optical path between the first imaging optical subsystem and the second surface; and

a third imaging optical subsystem with a third optical axis, which is arranged in an optical path between the second imaging optical subsystem and the second surface and has a dioptric imaging optical system,

wherein the first optical axis and the third optical axis are located on a common axis.

28. (Previously Presented) A projection exposure apparatus comprising:

a projection optical system which is arranged in an optical path between a first surface and a second surface that projects and exposes a pattern on a mask located on the first surface onto a workpiece located on the second surface, and

the projection optical system comprises:

a first imaging optical subsystem having a dioptric imaging optical system;

a second imaging optical subsystem having a concave reflecting mirror;

a third imaging optical subsystem having a dioptric imaging optical system;

a first folding mirror arranged in an optical path between the first imaging optical subsystem and the second imaging optical subsystem; and

a second folding mirror arranged in an optical path between the second imaging optical subsystem and the third imaging optical subsystem;

wherein the first imaging optical subsystem forms a first intermediate image of the first surface into the optical path between the first imaging optical subsystem and the second imaging optical subsystem, and the second imaging optical subsystem forms a second intermediate image of the first surface into the optical path between the second imaging optical subsystem and the third imaging optical subsystem.

29. (Previously Presented) The projection exposure apparatus of Claim 28, wherein:

the projection exposure apparatus projects the pattern on the mask onto the workpiece and exposes the pattern while the mask and the workpiece are moved in the same direction.

30. (Previously Presented) The projection exposure apparatus of Claim 29, wherein:

the first folding mirror has a first reflecting surface;

the second folding mirror has a second reflecting surface; and

the first reflecting surface and the second reflecting surface are positioned so that they do not overlap spatially.

31. (Original) The projection exposure apparatus of Claim 30, wherein:

the first and the second reflecting surfaces are substantially flat surfaces.

32. (Original) The projection exposure apparatus of Claim 29, wherein:

the projection optical system forms a reduced image of the pattern onto the workpiece.

33. (Original) The projection exposure apparatus of Claim 29, wherein:

at least one of the first imaging optical subsystem and the third imaging optical subsystem contains an aperture stop.

34. (Previously Presented) The projection exposure apparatus of Claim 29, wherein:

a plurality of optical members in the first imaging optical subsystem are arranged along a first optical axis extending in a straight line;

the concave reflecting mirror in the second imaging optical subsystem are arranged along a second optical axis; and

a plurality of optical members in the third imaging optical subsystem are arranged along a third optical axis extending in a straight line.

35. (Previously Presented) The projection exposure apparatus of Claim 29, wherein:

the first imaging optical subsystem and the third imaging optical subsystem have a common optical axis; and

the first surface and the second surface are orthogonal in a direction of gravity.

36. (Original) The projection exposure apparatus of Claim 29, wherein a magnification $\beta 2$ of the second imaging optical subsystem satisfies the following condition:

$0.82 < |\beta 2| < 1.20$.

37. (Original) The projection exposure apparatus of Claim 29, wherein the following condition is satisfied:

$0.20 < |\beta| / |\beta 1| < 0.50$

wherein a magnification of the projection optical system is defined as β, and a magnification of the first imaging optical subsystem is defined as $\beta 1$.

38. (Previously Presented) The projection exposure apparatus of Claim 29, wherein:

the projection optical system has a telecentric optical system on the side of first surface and on the side of second surface; and

a concave reflecting mirror in the second imaging optical subsystem is arranged in the vicinity of a pupil surface of the projection optical system.

39. (Previously Presented) The projection exposure apparatus of Claim 29, wherein:

the first intermediate image is formed in the optical path between the first folding mirror and a concave reflecting mirror in the second imaging optical subsystem; and

the second intermediate image is formed in the optical path between the concave reflecting mirror in the second imaging optical subsystem and the second folding mirror.

40. (Original) The projection exposure apparatus of Claim 39, wherein:

the first intermediate image and the second intermediate image are formed in both sides of a second optical axis of the second imaging optical subsystem.

41. (Original) The projection exposure apparatus of Claim 29, wherein:

a second optical axis of the second imaging optical subsystem is orthogonal to a first optical axis of the first imaging optical subsystem and a third optical axis of the third imaging optical subsystem.

42. (Original) The projection exposure apparatus of Claim 41, wherein:

the second optical axis of the second imaging optical subsystem extends in a straight line.

43. (Original) The projection exposure apparatus of Claim 29, wherein:

an intersection line of an extension plane of a reflecting surface of the first optical path folding mirror and an extension plane of a reflecting surface of the second optical path folding mirror intersects with a first optical axis of the first imaging optical subsystem, a second optical axis of the second imaging optical subsystem and a third optical axis of the third imaging optical subsystem at one point.

44. (Previously Presented) The projection exposure apparatus of Claim 29, wherein:

the first folding mirror has a back surface reflecting surface for reflecting a beam from the first imaging optical subsystem to the second imaging optical subsystem; and

the second folding mirror has a back surface reflecting surface for reflecting a beam from the second imaging optical subsystem to the third imaging optical subsystem.

45. (Original) The projection exposure apparatus of Claim 29, wherein an image of the first surface is formed in a position deviating from a position of a reference optical axis of the projection optical system on the second surface.

46. (Currently Amended) An exposure method for projecting a pattern ~~on a mask~~ onto a workpiece via a projection optical system, the method comprising:

directing an illuminating light in the ultraviolet region to the pattern;

directing the illuminating light to a first imaging optical subsystem containing a dioptric imaging optical system via the pattern to form a first intermediate image of the pattern ~~of the mask~~;

directing the illuminating light from the first intermediate image to a second imaging optical subsystem containing a concave reflecting mirror to form a second intermediate image;

directing the illuminating ~~a~~ light from the second intermediate image to a third imaging optical subsystem containing a dioptric imaging optical system;

deflecting the illuminating light from the first imaging optical subsystem by a first folding mirror arranged in an optical path between the first imaging optical subsystem and the second imaging optical subsystem; and

deflecting the illuminating light from the second imaging optical subsystem by a second folding mirror arranged in an optical path between the second imaging optical subsystem and the third imaging optical subsystem.

47. (Currently Amended) The exposure method of Claim 46, wherein:

the pattern ~~on the mask~~ is projected onto the workpiece and exposed while ~~the mask and~~ the workpiece ~~are~~ is moved ~~in the same direction for~~ relative to the projection optical system.

48. (Previously Presented) A manufacturing method of micro-devices comprising:

preparing a mask with a pattern;

preparing a workpiece;

projecting the pattern onto the workpiece using the projection exposure apparatus of Claim 29.

49. - 66. (Cancelled)

67. (Previously Presented) A catadioptric optical system forming a reduced image of a first surface onto a second surface comprising:

a first imaging optical subsystem with a first optical axis, which is arranged in an optical path between the first surface and the second surface and has a dioptric imaging optical system;

a second imaging optical subsystem with a concave reflecting mirror and a second optical axis, which is arranged in an optical path between the first imaging optical subsystem and the second surface;

a third imaging optical subsystem with a third optical axis, which is arranged in an optical path between the second imaging optical subsystem and the second surface and has a dioptric imaging optical system;

a first folding mirror which is arranged in an optical path between the first imaging optical subsystem and the second imaging optical subsystem; and

a second folding mirror which is arranged in an optical path between the second imaging optical subsystem and the third imaging optical subsystem,

wherein the first optical axis and the third optical axis are located on a common axis, and

wherein the first folding mirror and the second folding mirror are formed monolithically.

68. (Previously Presented) A catadioptric optical system forming an image of a first surface onto a second surface comprising:

a first imaging optical subsystem with a first optical axis, which is arranged in an optical path between the first surface and the second surface and has a dioptric imaging optical system;

a second imaging optical subsystem with a concave reflecting mirror and a second optical axis, which is arranged in an optical path between the first imaging optical subsystem and the second surface;

a third imaging optical subsystem with a third optical axis, which is arranged in an optical path between the second imaging optical subsystem and the second surface and has a dioptric imaging optical system;

a first folding mirror which is arranged in an optical path between the first imaging optical subsystem and the second imaging optical subsystem; and

a second folding mirror which is arranged in an optical path between the second imaging optical subsystem and the third imaging optical subsystem,

wherein the first optical axis and the third optical axis are located on a common axis, and

wherein an intersection line of an extension plane of a reflecting surface of the first folding mirror and an extension plane of a reflecting surface of the second folding mirror is on the common axis.

69. (Previously Presented) The catadioptric optical system according to claim 68, wherein the first folding mirror and the second folding mirror are formed monolithically.

70. - 84. (Cancelled)

85. (New) The catadioptric optical system of claim 15, wherein the following condition is satisfied:

$$|L1-L2|/|L1| < 0.15,$$

where a first distance between the first intermediate image and the concave reflecting mirror in the second imaging optical subsystem along the optical axis is defined as Ll, and a second distance between the second intermediate image and the concave reflecting mirror in the second imaging optical subsystem along the optical axis is defined as L2.

86. (New) The catadioptric optical system of claim 26, further comprising:

a first reflection surface arranged in an optical path between the first imaging optical subsystem and the second imaging optical subsystem; and

a second reflection surface arranged in an optical path between the second imaging optical subsystem and the third imaging optical subsystem.

87. (New) The catadioptric optical system of claim 86, wherein a first intermediate image is formed in an optical path between the first reflection surface and the second imaging optical subsystem by the first imaging optical subsystem, and a second

intermediate image is formed in an optical path between the second imaging optical subsystem and the second reflection surface by the second imaging optical subsystem.

88. (New) The catadioptric optical system of claim 87, wherein the following condition is satisfied:

$$|L1-L2|/|L1| < 0.15,$$

where a first distance between the first intermediate image and the concave reflecting mirror in the second imaging optical subsystem along the optical axis is defined as L1, and a second distance between the second intermediate image and the concave reflecting mirror in the second imaging optical subsystem along the optical axis is defined as L2.

89. (New) The catadioptric optical system of claim 26, wherein a magnification factor ß2 of the second imaging optical subsystem satisfies the following condition:

$$0.082 < |\beta 2| < 1.20.$$

90. (New) The catadioptric optical system of claim 89, wherein the following condition is satisfied:

$$0.20 < |\beta|/|\beta 1| < 0.50,$$

where a magnification of the catadioptric optical system is defined as ß, and a magnification of the first imaging optical subsystem is defined as ß1.

91. (New) The catadioptric optical system of claim 90, wherein the catadioptric optical system is a telecentric optical system on both sides of the first surface and the second surface, and satisfies the following condition:

$$|E-D|/|E| < 0.24,$$

where a distance between a surface of the first imaging optical subsystem on a most image side and an exit pupil position along the optical axis is defined as E, and a distance by air conversion from the surface of the first imaging optical subsystem on the most image side to

the concave reflecting mirror in the second imaging optical subsystem along the optical axis is defined as D.

92. (New) The catadioptric optical system of claim 89, wherein the second imaging optical subsystem has at least two negative lenses.

93. (New) The catadioptric optical system of claim 26, wherein 85% of the number of lenses in all lenses constituting the catadioptric optical system are arranged along a single optical axis, and wherein the first optical axis and the third optical axis form the single optical axis.

94. (New) The catadioptric optical system of claim 26, wherein the catadioptric optical system forms the reduced image in a position deviating from a position of a reference optical axis of the catadioptric optical system on the second surface.

95. (New) The catadioptric optical system of claim 27, further comprising:

a first reflection surface arranged in an optical path between the first imaging optical subsystem and the second imaging optical subsystem; and

a second reflection surface arranged in an optical path between the second imaging optical subsystem and the third imaging optical subsystem.

96. (New) The catadioptric optical system of claim 95, wherein a first intermediate image is formed in an optical path between the first reflection surface and the second imaging optical subsystem by the first imaging optical subsystem, and a second intermediate image is formed in an optical path between the second imaging optical subsystem and the second reflection surface by the second imaging optical subsystem.

97. (New) The catadioptric optical system of claim 96, wherein the following condition is satisfied:

$$|L1-L2|/|L1| < 0.15,$$

where a first distance between the first intermediate image and the concave reflecting mirror in the second imaging optical subsystem along the optical axis is defined as L1, and a second distance between the second intermediate image and the concave reflecting mirror in the second imaging optical subsystem along the optical axis is defined as L2.

98. (New) The catadioptric optical system of claim 95, wherein an intersection line of an extension plane of the first reflection surface and an extension plane of the second reflection surface is set up so that the first optical axis of the first imaging optical subsystem, the second optical axis of the second imaging optical subsystem and the third optical axis of the third imaging optical subsystem intersect at one point.

99. (New) The catadioptric optical system of claim 27, wherein a magnification factor ß2 of the second imaging optical subsystem satisfies the following condition:

$$0.082 < |\beta 2| < 1.20.$$

100. (New) The catadioptric optical system of claim 99, wherein the following condition is satisfied:

$$0.20 < |\beta| / |\beta 1| < 0.50,$$

where a magnification of the catadioptric optical system is defined as ß, and a magnification of the first imaging optical subsystem is defined as ß1.

101. (New) The catadioptric optical system of claim 100, wherein the catadioptric optical system is a telecentric optical system on both sides of the first surface and the second surface, and satisfies the following condition:

$$|E-D| / |E| < 0.24,$$

where a distance between a surface of the first imaging optical subsystem on a most image side and an exit pupil position along the optical axis is defined as E, and a distance by air conversion from the surface of the first imaging optical subsystem on the most image side to

the concave reflecting mirror in the second imaging optical subsystem along the optical axis is defined as D.

102. (New) The catadioptric optical system of claim 99, wherein the second imaging optical subsystem has at least two negative lenses.

103. (New) The catadioptric optical system of claim 27, wherein 85% of the number of lenses in all lenses constituting the catadioptric optical system are arranged along a single optical axis, and wherein the first optical axis and the third optical axis form the single optical axis.

104. (New) The catadioptric optical system of claim 27, wherein the catadioptric optical system forms the reduced image in a position deviating from a position of a reference optical axis of the catadioptric optical system on the second surface.

105. (New) The projection exposure apparatus of claim 36, wherein the following condition is satisfied:

$$0.20 < |\beta| / |\beta 1| < 0.50$$

wherein a magnification of the projection optical system is defined as ß, and a magnification of the first imaging optical subsystem is defined as ß1.

106. (New) The exposure method of claim 46, wherein the first intermediate image of the pattern is formed in an optical path between the first folding mirror and the second imaging optical subsystem by the first imaging optical subsystem, and the second intermediate image is formed in an optical path between the second imaging optical subsystem and the second folding mirror by the second imaging optical subsystem.

107. (New) The exposure method of claim 106, wherein the following condition is satisfied:

$$|L1-L2| / |L1| < 0.15,$$

where a first distance between the first intermediate image and the concave reflecting mirror in the second imaging optical subsystem along the optical axis is defined as L1, and a second distance between the second intermediate image and the concave reflecting mirror in the second imaging optical subsystem along the optical axis is defined as L2.

108. (New) The exposure method of claim 46, wherein an intersection line of an extension plane of the first folding mirror and an extension plane of the second folding mirror is set up so that an optical axis of the first imaging optical subsystem, an optical axis of the second imaging optical subsystem and an optical axis of the third imaging optical subsystem intersect at one point.

109. (New) The exposure method of claim 46, wherein a magnification factor ß2 of the second imaging optical subsystem satisfies the following condition: $0.082 < |\beta 2| < 1.20$.

110. (New) The exposure method of claim 109, wherein the following condition is satisfied:

$$0.20 < |\beta|/|\beta 1| < 0.50,$$

where a magnification of the catadioptric optical system is defined as ß, and a magnification of the first imaging optical subsystem is defined as ß1.

111. (New) The exposure method of claim 110, wherein the catadioptric optical system is a telecentric optical system on both sides of the first surface and the workpiece, and satisfies the following condition:

$$|E\text{-}D|/|E| < 0.24,$$

where a distance between a surface of the first imaging optical subsystem on a most image side and an exit pupil position along the optical axis is defined as E, and a distance by air conversion from the surface of the first imaging optical subsystem on the most image side to the concave reflecting mirror in the second imaging optical subsystem along the optical axis is defined as D.

112. (New) The exposure method of claim 109, wherein the second imaging optical subsystem has at least two negative lenses.

113. (New) The exposure method of claim 46, wherein 85% of the number of lenses in all lenses constituting the catadioptric optical system are arranged along a single optical axis, and wherein an optical axis of the first imaging optical subsystem and an optical axis of the third imaging optical subsystem form the single optical axis.

114. (New) The exposure method of claim 46, further comprising:

the step of forming an image in a position deviating from a position of a reference optical axis of the third imaging optical subsystem on the workpiece.

115. (New) A manufacturing method of micro-devices comprising the steps of:

preparing a pattern;

preparing a workpiece; and

exposing the pattern onto the workpiece with the exposure method of claim 46.

116. (New) The catadioptric optical system of claim 67, wherein:

a first intermediate image is formed in an optical path between the first folding mirror and the second imaging optical subsystem by the first imaging optical subsystem, and

a second intermediate image is formed in an optical path between the second imaging optical subsystem and the second folding mirror by the second imaging optical subsystem.

117. (New) The catadioptric optical system of claim 116, wherein the following condition is satisfied:

$$|L1-L2|/|L1| < 0.15,$$

where a first distance between the first intermediate image and the concave reflecting mirror in the second imaging optical subsystem along the optical axis is defined as L1, and a second

distance between the second intermediate image and the concave reflecting mirror in the second imaging optical subsystem along the optical axis is defined as L2.

118. (New) The catadioptric optical system of claim 67, wherein an intersection line of an extension plane of the first folding mirror and an extension plane of the second folding mirror is set up so that the first optical axis of the first imaging optical subsystem, the second optical axis of the second imaging optical subsystem and the third optical axis of the third imaging optical subsystem intersect at one point.

119. (New) The catadioptric optical system of claim 67, wherein a magnification factor ß2 of the second imaging optical subsystem satisfies the following condition:

$$0.082 < |\beta 2| < 1.20.$$

120. (New) The catadioptric optical system of claim 119, wherein the following condition is satisfied:

$$0.20 < |\beta| / |\beta 1| < 0.50,$$

where a magnification of the catadioptric optical system is defined as ß, and a magnification of the first imaging optical subsystem is defined as ß1.

121. (New) The catadioptric optical system of claim 120, wherein the catadioptric optical system is a telecentric optical system on both sides of the first surface and the second surface, and satisfies the following condition:

$$|E\text{-}D| / |E| < 0.24,$$

where a distance between a surface of the first imaging optical subsystem on a most image side and an exit pupil position along the optical axis is defined as E, and a distance by air conversion from the surface of the first imaging optical subsystem on the most image side to the concave reflecting mirror in the second imaging optical subsystem along the optical axis is defined as D.

122. (New) The catadioptric optical system of claim 119, wherein the second imaging optical subsystem has at least two negative lenses.

123. (New) The catadioptric optical system of claim 122, wherein the at least two negative lenses have a meniscus lens.

124. (New) The catadioptric optical system of claim 67, wherein 85% of the number of lenses in all lenses constituting the catadioptric optical system are arranged along a single optical axis, and wherein the first optical axis and the third optical axis form the single optical axis.

125. (New) The catadioptric optical system of claim 67, wherein the catadioptric optical system forms the reduced image in a position deviating from a position of a reference optical axis of the catadioptric optical system on the second surface.

126. (New) The catadioptric optical system of claim 69, wherein the first and the second folding mirrors have substantially flat reflection surfaces.

127. (New) The catadioptric optical system of claim 68, wherein at least one of the first imaging optical subsystem and the third imaging optical subsystem contains an aperture stop.

128. (New) The catadioptric optical system of claim 68, wherein a plurality of optical members in the first imaging optical subsystem are arranged along the first optical axis extending in a straight line, the concave reflecting mirror in the second imaging optical subsystem is arranged along the second optical axis, and a plurality of optical members in the third imaging optical subsystem are arranged along the third optical axis extending in a straight line.

129. (New) The catadioptric optical system of claim 128, wherein 85% of the number of lenses in all lenses constituting the catadioptric optical system are arranged along the common axis.

130. (New) The catadioptric optical system of claim 128, wherein the second optical axis of the second imaging optical subsystem is orthogonal to the first optical axis of the first imaging optical subsystem and the third optical axis of the third imaging optical subsystem.

131. (New) The catadioptric optical system of claim 68, wherein the first surface and the second surface are orthogonal in a direction of gravity.

132. (New) The catadioptric optical system of claim 68, wherein a magnification factor ß2 of the second imaging optical subsystem satisfies the following condition:

$$0.082 < |\beta 2| < 1.20.$$

133. (New) The catadioptric optical system of claim 132, wherein the following condition is satisfied:

$$0.20 < |\beta| / |\beta 1| < 0.50,$$

wherein a magnification of the projection optical system is defined as ß, and a magnification of the first imaging optical subsystem is defined as ß1.

134. (New) The catadioptric optical system of claim 132, wherein the second imaging optical subsystem has at least two negative lenses.

135. (New) The catadioptric optical system of claim 68, wherein the following condition is satisfied:

$$0.20 < |\beta| / |\beta 1| < 0.50,$$

wherein a magnification of the projection optical system is defined as ß, and a magnification of the first imaging optical subsystem is defined as ß1.

136. (New) The catadioptric optical system of claim 68, wherein the projection optical system has a telecentric optical system on the side of first surface and on the side of second surface, and the concave reflecting mirror in the second imaging optical subsystem is arranged in the vicinity of a pupil surface of the projection optical system.

137. (New) The catadioptric optical system of claim 68, wherein a first intermediate image is formed in the optical path between the first folding mirror and the concave reflecting mirror in the second imaging optical subsystem, and a second intermediate image is formed in the optical path between the concave reflecting mirror in the second imaging optical subsystem and the second folding mirror.

138. (New) The catadioptric optical system of claim 137, wherein the first intermediate image and the second intermediate image are formed in both sides of the second optical axis of the second imaging optical subsystem.

139. (New) The catadioptric optical system of claim 137, wherein the following condition is satisfied:

$$|L1-L2|/|L1| < 0.15,$$

where a first distance between the first intermediate image and the concave reflecting mirror in the second imaging optical subsystem along the optical axis is defined as L1, and a second distance between the second intermediate image and the concave reflecting mirror in the second imaging optical subsystem along the optical axis is defined as L2.

140. (New) The catadioptric optical system of claim 137, wherein the second optical axis of the second imaging optical subsystem extends in a straight line.

141. (New) The catadioptric optical system of claim 68, wherein the intersection line of the extension plane of the reflecting surface of the first optical path folding mirror and the extension plane of the reflecting surface of the second optical path folding mirror intersects with the first optical axis of the first imaging optical subsystem, the second optical axis of the second imaging optical subsystem and the third optical axis of the third imaging optical subsystem at one point.

142. (New) The catadioptric optical system of claim 68, wherein the image of the first surface is formed in a position deviating from a position of a reference optical axis of the projection optical system on the second surface.